REMARKS/ARGUMENTS

The Applicants have filed the present Amendment pursuant to 37 C.F.R. § 1.111 in reply to the outstanding Official Action of October 6, 2003, and the Applicants believe the Amendment to be fully responsive to the Official Action for the reasons set forth below.

In the Official Action, the Examiner first rejected Claims 15-18 pursuant to 35 U.S.C. § 112, second paragraph, as allegedly indefinite for the reasons set forth in the Official Action. The Examiner further rejected Claims 1-3, 12 and 14 pursuant to 35 U.S.C. § 102(b), as allegedly anticipated by Hatano, *et al.* (U.S. Patent No. 6,091,450) (hereinafter "Hatano"). Lastly, the Examiner rejected Claims 4-11 and 13 pursuant to 35 U.S.C. § 103(a), as allegedly unpatentable over Hatano in view of Sugano, *et al.* (U.S. Patent No. 6,473,459) (hereinafter "Sugano").

At the outset and before addressing the rejections raised in the present Official Action, the Applicants have first made an editorial correction to page 9 of the specification, as recited herein. Furthermore, the Applicants have cancelled dependent Claims 8 and 17 without prejudice or disclaimer, and have amended the independent Claims 1, 4 and 12, with the subject matter of the cancelled Claims 8 and 17, as particularly recited herein. More specifically, the Applicants amended the independent Claims 1 and 12 to more specifically recite an inventive feature of the present invention in that the decision circuitry determines a magnitude of motion of the input frames relative to the reference frames and a time-varying rate of the magnitude, determines an interval between successive frames of the predictive coded picture according to the magnitude of motion and the time-varying rate of the magnitude, and reorders the input

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frames according to the determined interval. The Applicants further amended Claim 4 to more specifically recite an inventive feature of the present invention in that the decision circuitry calculates a time-varying rate of the mean value of detected motion vectors and determines an interval between successive frames of the predictive coded picture according to the calculated mean value and the calculated time-varying rate of the mean value, and modifies the control signal according to the determined interval. The Applicants have likewise amended the dependent Claims 2-3, 5-6, 9, 13-16 and 18 for consistency with the amended independent Claims 1, 4 and 12. Additionally, the Applicants have amended the dependencies of Claims 9 and 18 to account for the cancellation of Claims 18 and 17 from which the foregoing claims were respectively dependent. Support for the foregoing amendments is found in Fig 7 with reference to the description on page 14, lines 14-page 17, line 2. The Applicants respectfully submit that no new subject matter has been entered via these amendments.

Therefore, the only pending claims that remain in the above-identified application are Claims 1-7, 9-16 and 18. Claims 8 and 17 have been cancelled.

Regarding the rejection of Claims 15-18 (Claim 17 cancelled) pursuant to 35 U.S.C § 112, second paragraph, the Applicants have amended the dependencies of Claims 15 and 16 to depended from Claim 13. Claims 13 provides sufficient antecedent basis for the limitation "mean value" recited in Claims 15 and 16. Consequently, the Applicants respectfully request the Examiner to withdraw the rejection of Claims 15-18 pursuant to 35 U.S.C. § 112, second paragraph.

In traversing the rejection of the independent Claims 1 and 12 pursuant to 35 U.S.C. § 102(b), the Applicants respectfully submit that the primary prior art reference

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to Hatano is defective in that it fails to disclose a video coding apparatus and video coding method which comprise decision circuitry and steps, respectively, for determining a magnitude of motion of the input frames relative to the reference frames and a time-varying rate of the magnitude, determining an interval between successive frames of the predictive coded picture according to the magnitude of motion and the time-varying rate of the magnitude, and reordering the input frames according to the determined interval, as particularly recited in the foregoing independent Claims 1 and 12. More specifically, in accordance with the present invention, the interval (M-value) between successive frames (P-pictures) is determined not only by the magnitude of motion of input frames, but also by the time-varying rate of the magnitude (See present specification on page 15, lines 2-14). This enables the claimed video coding system to determine an appropriate frame interval even when the magnitude of motion shrinks abruptly due to a fast moving picture. As described in page 16, lines 4-17, when the average motion vector decreases sharply and crosses the zero point (when the number of frames is about 170 as indicated by the dotted curve in Fig. 8), an optimum value of frame interval M = 1 can be obtained for the fast moving pictures. The primary prior art reference to Hatano is directed to a video coding system that uses inter-frame prediction error to determine the speed of motion (See Hatano Col. 35, lines 1-43) and further determines the frame interval between P-picture frames by the number of B-picture frames to be inserted between the P-picture frames, depending on the speed of motion. However, to the contrary of the claimed invention, Hatano does not disclose determining the interval between P-picture frames using the magnitude of motion and the time-varying rate of the magnitude.

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Consequently, the Applicants respectfully submits that Hatano fails to disclose a video coding apparatus and video coding method which comprise decision circuitry and steps, respectively, for determining a magnitude of motion of the input frames relative to the reference frames and a time-varying rate of the magnitude, determining an interval between successive frames of the predictive coded picture according to the magnitude of motion and the time-varying rate of the magnitude, and reordering the input frames according to the determined interval, as particularly recited in the foregoing independent Claims 1 and 12

In view of the foregoing, the Applicants respectfully request the Examiner to withdraw the rejection of the independent Claims 1 and 12 pursuant to 35 U.S.C. § 102(b). Furthermore, the Applicants respectfully request the Examiner to withdraw rejection of the dependent Claims 2-3 and 14, based at least on their respective dependencies from the independent Claims 1 and 12.

In traversing the rejection of the independent Claim 4 and dependent Claims 5-7, 9-11 and 13 (Claim 8 cancelled) pursuant to 35 U.S.C. § 103(a), the Applicants respectfully submit that the Hatano-Sugano combination is defective in that it fails to teach or suggest decision circuitry for calculating a time-varying rate of the mean value of detected motion vectors and determining an interval between successive frames of the predictive coded picture according to the calculated mean value and the calculated time-varying rate of the mean value, and modifying the control signal according to the determined interval, as particularly recited in the independent Claim 4. The Applicants respectfully submit that arguments presented hereinabove regarding the deficiency in Hatano are applicable here and are incorporated herein in their entirety. In addition, the

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Applicants respectfully submit that Hatano does not teach or suggest decision circuitry that determines the interval between successive frames according to the calculated mean value and the calculated time-varying rate of the mean value. The secondary prior art reference to Sugano does not rectify the deficiency identified in Hatano. Sugano is directed to scene change detection. Sugano teaches a motion vector calculating unit for accumulating reconstructed motion vectors and averaging the vectors for areas used in the detection of a scene change (See Sugano, Fig. 2, no. 14 in view of Col. 4, lines 44-60 and Col. 5, lines 26-45). More specifically, Sugano calculates the mean value of motion vectors to determine the frame interval (See Sugano Col. 5, lines 36-40 and Col. 7, lines 31-43). However, Sugano does not rectify the deficiency in Hatano because, just like Hatano, Sugano does not teach or suggest determining the interval between the frames according to the calculated mean value and the calculated time-varying rate of the mean value. If the Hatano and Sugano references were indeed combined, the combination would result in a system that attempts to increase the P-picture frame interval in response to a sharp drop in the magnitude of motion to zero, which would subsequently cause the combined system to find an insufficient search range for detecting an appropriate P-picture frame. Thus, the combined Hatano-Sugano system would fail to operate properly.

Consequently, the Hatano-Sugano combination does not teach or suggest decision circuitry for calculating a time-varying rate of the mean value of detected motion vectors and determining an interval between successive frames of the predictive coded picture according to the calculated mean value and the calculated time-varying rate of the mean value, and modifying the control signal according to the determined interval, as particularly recited in the independent Claim 4.

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In view of the foregoing, the Applicants respectfully request the Examiner to withdraw the rejection of the independent Claim 4 pursuant to 35 U.S.C. § 103(a). In addition, the Applicants respectfully request the Examiner to withdraw the rejection of Claims 5-7 and 9-11, based at least on their respective dependencies from the independent Claim 4. Lastly, the Applicants respectfully request the Examiner to withdraw the rejection of Claim 13, based at least on its respective dependency from the independent Claim 12.

In sum, the Applicants believe that the above-identified application is in condition for allowance and henceforth respectfully solicit the allowance of the application. If the Examiner believes a telephone conference might expedite the allowance of this application, the Applicants respectfully request that the Examiner call the undersigned, Applicants' attorney, at the following telephone number: (516) 742-4343.

Respectfully submitted,

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